Circular Buffers

Regarding the use of a circular buffer, the Examiner has clarified his interpretation of the claims as defining *"the circular buffer memory which stores input and output of polygons of the primitive"* which he then reads on the *"vertex look up table"*[1]. However, it is respectfully submitted that the term "circular buffer" has a specific meaning to one of ordinary skill in this art. Specifically, as shown in the attached excerpt from the Encyclopedia of Computer Science and Engineering, 2nd Edition, a circular buffer is filled (and emptied) *"starting from START and incrementing the pointer ... when the last word of the buffer has been filed (IN=END), then IN is reset to START and subsequent data will wrap around to the start of the buffer"*[2]. The name derives from its logical appearance as a continuous loop.

However, this does not appear to be how the vertex look up table (OR the VRAM) of Rossin is organized. Rather, in the example shown in Figure 5A, the table appears to be filled starting in the middle with three output vertices. These output vertices are moved to the first three positions of the table to form new input vertices, while new output vertices are calculated, including two new vertices, one of which replaces an old vertex. The new output vertices are moved to the input vertices spots to begin a further iteration. It is respectfully submitted that this is not the same as a circular buffer, where the storing of values proceeds in a sequential, stepwise fashion (with necessary returns to the beginning of the table when necessary).

Barycentric Coordinates

Regarding the use of barycentric coordinates, it is respectfully submitted that while Watkins (which uses barycentric coordinates)

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[1] Office Action of 11/21/2001, Page 6, last paragraph

[2] definition of "buffer" in Encyclopedia of Computer Science and Engineering, 2nd edition

appears to disclose a computer graphics system, it appears to be addressing a different process in the production of graphics than either of the other two references relied on. Both Rossin and Narayanaswami appear to be directed to clipping, which is handled in the geometry accelerator (see Figures 1 and 2 of Rossin), but Watkins appears to be directed to the problems of texturing and perspective, which are handled in the texture mapping subsystem, located AFTER clipping in the processing stream. This distinction is important in at least two important ways:

Combination Does Not Meet Claimed Limitations

It is respectfully submitted that one of ordinary skill in the art, in combining the references relied, on would not reach a clipping process using barycentric coordinates, rather the combination would have a clipping process which uses the XYZW coordinates and a texture process which uses barycentric coordinates. Watkins does not appear to receive barycentric coordinates from the preceding steps, such as the clipping programs - it must generate them. Thus, it is respectfully submitted, this combination would NOT meet the limitations expressed in the claims.

Motive to Combine

Given that the reference which uses barycentric coordinates is not directed to the same graphics processing step, it is respectfully submitted that the combination of Rossin and Narayanaswami with Watkins does NOT appear to be a combination which would be made by one of ordinary skill in computer graphics, nor does it appear to be one suggested by the references relied on. Note particularly that Watkins appears to use barycentric coordinates in only one small part of the flow shown in Figure 11, while the more usual coordinates are used else-where, even in this one section.

The Examiner has given the motivation to combine as being to *"facilitate interpolation ... and to easily determine if a point on the*

clipping plane in inside or outside the polygon as taught by Watkins"[3]. At least this latter point does not appear to be supported by Watkins, as seen in Figure 11. In this drawing, which shows the processing flow, the determination as to whether a pixel is in the polygon or not is determined in step 64. Only IF the pixel is already determined to be in the polygon will the barycentric coordinates be calculated in step 74. Not only do the barycentric coordinates not appear to be used to determine if the pixel is in the polygon, they haven't even been calculated at the time this determination is made!

Thus, it is respectfully submitted that a sufficient motive to combine does not exist.

Claim Distinctions

Some features of the claims are noted as follows for the Examiner's convenience, but of course these notes do not dictate the interpretation of the claim, nor indicate that some features are more important than others.

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*defining all vertices of a primitive using relational coordinates*" as recited, with other limitations, in the context of Claim 1.

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*using a clipping algorithm with a circular buffer*" as recited, with other limitations, in the context of Claim 1.

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*circuitry to define all vertices of a primitive using relational coordinates*" as recited, with other limitations, in the context of Claim 16.

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[3] Office Action of 11/21/2000, last paragraph of page 2, which is continued on page 3

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*circuitry to implement a clipping algorithm with a circular buffer to store input and output polygons of said primitive*" as recited, with other limitations, in the context of Claim 16.

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*assign a fixed barycentric coordinate to each vertex of said primitive*" as recited, with other limitations, in the context of Claim 36.

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*wherein two circular buffers are used to store said input and output polygons*" as recited, with other limitations, in the context of Claim 36.
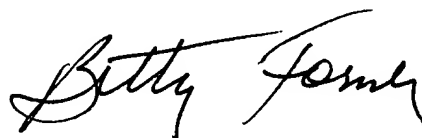
None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: *assign a fixed barycentric coordinate to each vertex of said primitive*" as recited, with other limitations, in the context of Claim 43.

None of the references relied on, singly or in any motivated combination, are seen to teach or suggest the claimed features of: "*wherein two circular buffers are used to store said input and output polygons*" as recited, with other limitations, in the context of Claim 43.

Conclusion

Thus, all grounds of rejection and/or objection are believed overcome and favorable reconsideration and allowance are respectfully requested. The Examiner is cordially invited to telephone the under-signed attorney or agent if it appears that an interview might be useful for any reason.

Respectfully submitted,

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